volume 43/6 Number

Roundup

SPACE CENTER ROUNDUP

Lyndon B. Johnson Space Center

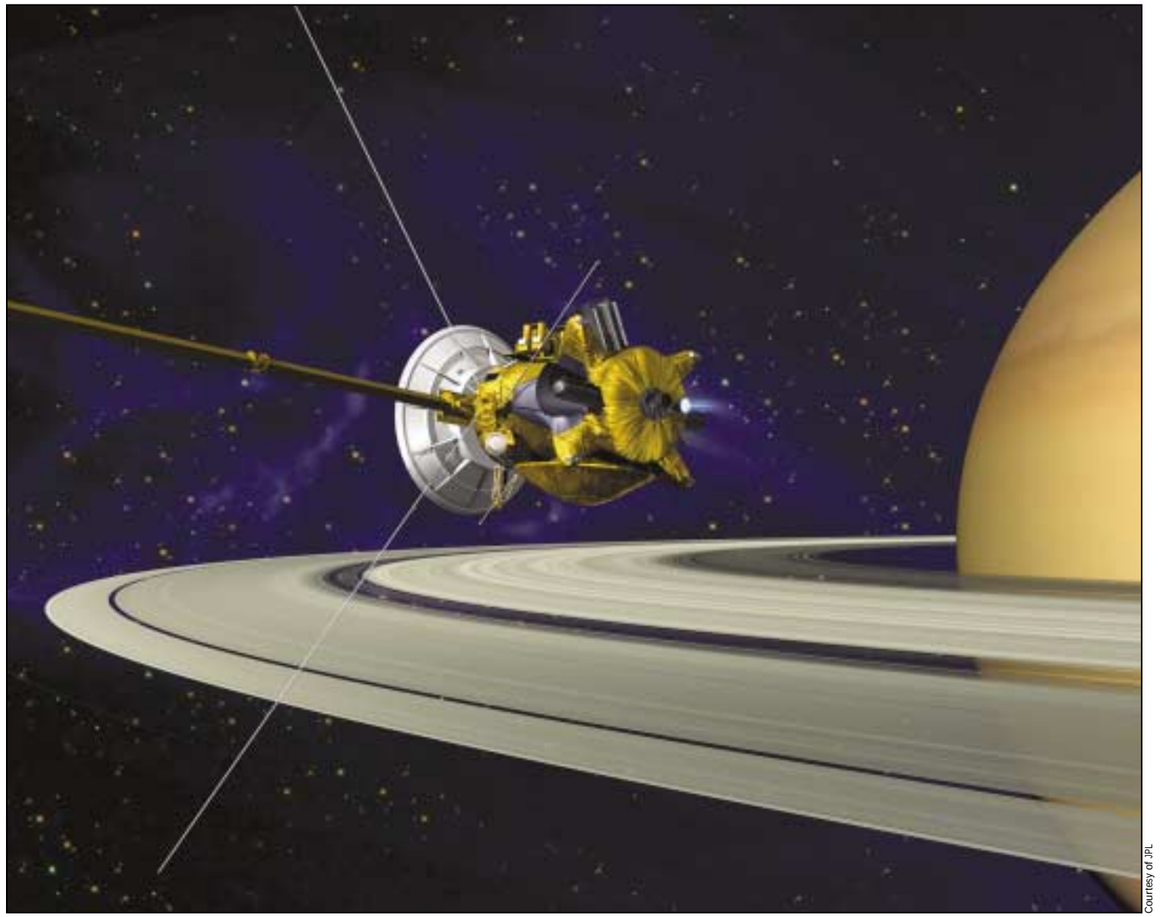
Welcome home, Expedition 8

NASA/NGALLS JSC2004E21246

NASA/NGALLS JSC2004E21242

NASA/NGALLS JSC2004E21251

Astronaut C. Michael Foale, Expedition 8 commander and NASA International Space Station Science Officer, and his crewmates cosmonaut Alexander Y. Kaleri, Soyuz Flight Engineer representing Russia's Federal Space Agency, and European Space Agency (ESA) Astronaut André Kuipers of the Netherlands, successfully landed in north central Kazakhstan on April 30, in their Soyuz TMA-3 capsule. Foale and Kaleri completed 195 days in space aboard the International Space Station while Kuipers returned after an 11-day research mission as part of a commercial agreement between ESA and Russia's Federal Space Agency.



Courtesy of JPL

Saturn unveiled

JPL's next major milestone will be the Cassini spacecraft's arrival at Saturn on July 1. This is an artist's concept of Cassini during the Saturn Orbit Insertion (SOI) maneuver, just after the main engine has begun firing. The spacecraft is moving out of the plane of the page and to the right (firing to reduce its spacecraft velocity with respect to Saturn) and has just crossed the ring plane.

The SOI maneuver, which is approximately 90 minutes long, will allow Cassini to be captured by Saturn's gravity into a five-month orbit. Cassini's close proximity to the planet after the maneuver offers a unique opportunity to observe Saturn and its rings at extremely high resolution.

Read more about Cassini's arrival on pages 4 and 5.

June 2004

Houston, Texas

Space Center Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Johnson Space Center, Houston, Texas, and is published by the Public Affairs Office for all Space Center employees. The Roundup office is in Bldg. 2, Rm. 166A. The mail code is AP121. Visit our Web site at: www.jsc.nasa.gov/roundup/weekly/
For distribution questions or to suggest a story idea, please call 281/244-6397 or send an e-mail to roundup@ems.jsc.nasa.gov.

Joanne Hale Editor
Kendra Phipps Assistant Editor
Marshall Mellard Graphic Designer

PRSRT STD
U.S. POSTAGE
PAID
WEBSTER, TX
Permit No. G27

Beak Sends...

A MESSAGE FROM CENTER DIRECTOR LT. GEN. JEFFERSON D. HOWELL JR.

Heads up!

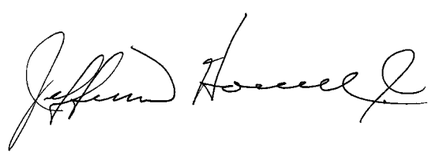
I need your help. During the past two months we have had a series of incidents at our Center that have resulted in injury and lost workdays for several of our employees. This is not the type of activity that should be occurring at a VPP Star Site. We must turn this trend around.

Occurrences such as slipping/stumbling on stairs and walkways, falling from a stool, leaning into a van cab, reaching up to a light fixture, pushing a box, to name a few, have resulted in twisted ankles, broken toes, injured elbows, stiff backs, etc. In almost every case, the victim's actions played a part in the injury. Our attention is diverted and we do something careless, or we aggravate an old injury. We have important work to do, but most important is taking care of ourselves and our coworkers. The simple act of slowing down, watching where one was stepping or not overstressing known strains or weaknesses would have prevented a lot of pain and suffering.

I know that we are all very busy as these are stressful times. Frankly, there is nothing we can do about that. The demands of Return-to-Flight, keeping the International Space Station operating and meeting the multitude of "Vision" requirements has all of us "churning and burning." As a matter of fact, I wouldn't have it any other way. Our expertise and core competencies are in great demand and we should be very pleased about that.

What we can do about this situation is "play smart." Let's acknowledge that we have a full plate. Let's realize that we are in a stressful situation and that it is easy to be distracted. Let's be mindful of our own physical limitations. With that in mind, let's **be careful** in everything we do and purposely watch out for each other. Realization of our present environment and adjusting our pace to maintain a high state of awareness will help us return to a safe, efficient, injury-free workplace.

Heads up!

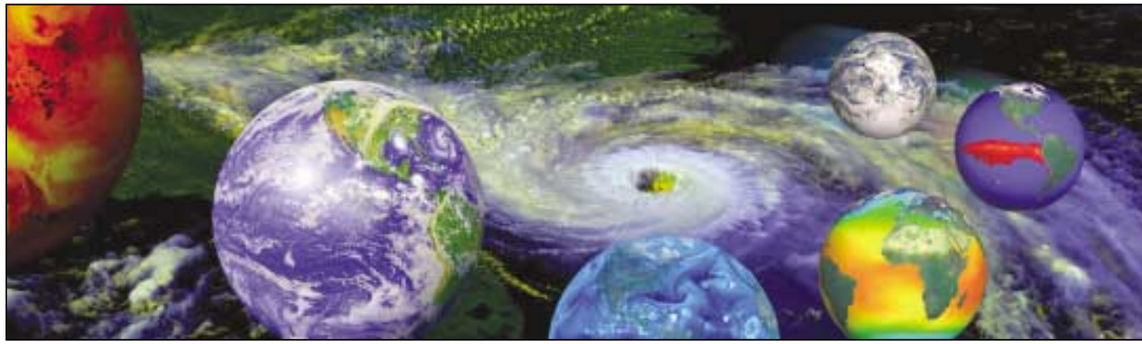


HURRICANE Awareness

by Robert Gaffney

As we approach another hurricane season, which began June 1 and lasts until November 30, the Center is once again reviewing and updating plans for preparing for a hurricane. Every year the Hurricane Rideout Team (HRT) conducts an exercise that reinforces critical decision-making skills based on the data presented. After the simulation, the HRT identifies lessons learned and implements any changes needed in the hurricane plan.

One rule of thumb that the National Weather Service suggests to use for hurricane response is to plan for one category of storm higher than forecast and landfall 12 hours sooner than expected. Although severe weather forecasts and evaluation methods have improved significantly, hurricanes can still be unpredictable in their path, speed and intensity.



Visualization of Remote Sensing Data is a showcase for imagery created by the Laboratory for Atmospheres at NASA Goddard Space Flight Center and by other groups. The visualizations are derived from satellite data, which have been color-enhanced or otherwise processed to yield high-impact renderings of hurricanes and other natural phenomena.

As the hurricane season approaches, all organizations should review their hurricane and severe weather plans and their state of readiness and maintain vigilance throughout the hurricane season. If a storm enters the Gulf of Mexico and could threaten JSC within 72 hours, the Center initiates preparations in phases that enable designated teams to prepare JSC to close down in a timely manner. The decision to release employees or close the Center is reserved to the Center Director.

There are more than 800,000 people who may have to evacuate the Coastal areas around Galveston County in the event of a major storm. In order to assure that you have the ability to evacuate, you should plan to leave the area as soon as possible. Plan your evacuation route ahead of time.

Strong winds and heavy rains can pose a threat to human life and property but the most dangerous element of a hurricane is the storm surge. Tides of 3 feet to 10 feet are common for even moderate storms. Add to that the wind-driven waves and a significantly higher surge is attained. On Sept. 11, 1961, when Hurricane Carla, a Category 4 storm, slammed into Port Lavaca, a 22-foot storm surge resulted in flooding as far inland as 10 miles. Nine out of 10 deaths during a hurricane are a result of the storm surge.

The Center has a plan – do you?

JPL aids NASA's *exploration efforts*

Located in Pasadena, Calif., near the site where Caltech professor Theodore von Kármán oversaw pioneering work in rocket propulsion in the 1930s, JPL leads NASA's efforts in the robotic exploration of the solar system and the universe beyond.

One Team, One Journey, One NASA ... "Building the Future Together"

by Mark P. Whalen

Courtesy of ESA

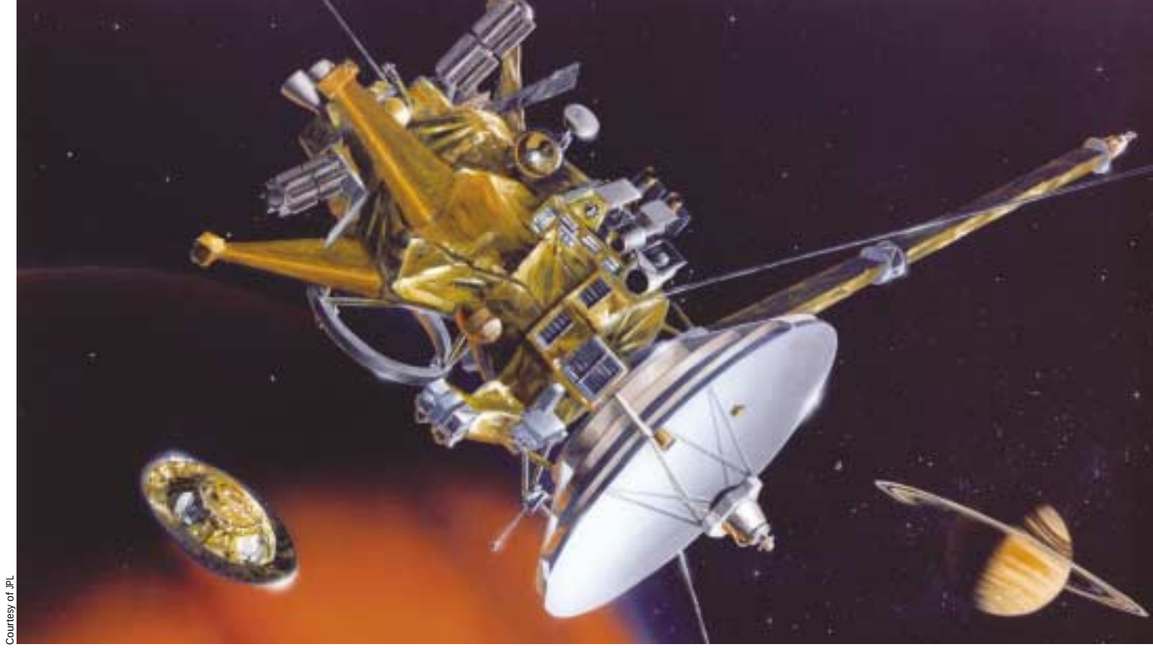
An artist's impression of the Rosetta orbiter and lander approaching comet 67P/Churyumov-Gerasimenko.

THE American space age began Jan. 31, 1958, with the launch of the first U.S. satellite, Explorer 1, built and controlled by the Jet Propulsion Laboratory (JPL), a federally funded research and development facility managed by the California Institute of Technology (Caltech) for NASA. In the four decades since then, JPL has led the world in exploring all of the solar system's known planets, except Pluto, with robotic spacecraft. The tools developed at JPL for its spacecraft expeditions to other planets have also proved invaluable in providing new insights and discoveries in studies of Earth, its atmosphere, climate, oceans, geology and the biosphere.

Today, JPL continues as a world leader in science and technology, breaking new ground in the miniaturization and efficiency of spacecraft components. At the same time, the Laboratory is pushing the sensitivity of space sensors and broadening their applications for a myriad of scientific, medical, industrial and commercial uses on Earth.

JPL currently has 17 spacecraft and four major flight instruments in operation throughout the solar system. These range from the twin Voyager 1 and 2 spacecraft, launched in 1977, to the Microwave Instrument on the Rosetta orbiter, launched on March 2.

JPL's next major milestone will be the Cassini spacecraft's arrival at Saturn on July 1. A joint endeavor of NASA, the European Space Agency and the Italian Space Agency, Cassini is sending a sophisticated robotic spacecraft to orbit the ringed planet and study the Saturnian system in detail over a four-year period. Onboard Cassini is a scientific probe called Huygens that will be released from the main spacecraft to parachute through the atmosphere to the surface of Saturn's largest moon, Titan. The Huygens probe will descend to the surface of Titan on Jan. 14, 2005.



Courtesy of JPL

This artist's conception of the Cassini orbiter shows the Huygens probe separating to enter Titan's atmosphere. After separation, the probe drifts for about three weeks until reaching its destination, Titan. Equipped with a variety of scientific sensors, the Huygens probe will spend 2-2.5 hours descending through Titan's dense, murky atmosphere of nitrogen and carbon-based molecules, beaming its findings to the distant Cassini orbiter overhead. The probe could continue to relay information for up to 30 minutes once it lands on Titan's frigid surface, after which the orbiter passes beneath the horizon as seen from the probe.

To provide tracking and communications for planetary spacecraft, JPL designed, built and operates NASA's Deep Space Network of antenna stations. Communications complexes are located in California's Mojave Desert, in Spain and in Australia. In addition to NASA missions, the network regularly performs tracking for international missions sending spacecraft to deep space. Ground stations also conduct experiments using radar to image planets and asteroids, as well as experiments using the technique of very long baseline interferometry to study extremely distant celestial objects.

In the three decades it has led the nation's planetary exploration program, JPL has honed several skills and areas of innovation, including deep space navigation and communication, digital image processing, imaging systems, intelligent automated systems, instrument technology, microelectronics and more. Many of these disciplines found applications outside the planetary spacecraft field, from solar energy to medical imagery.

JPL has also applied space-based operational, communication and information processing techniques to the needs of the Department of Defense, Federal Aviation Administration and other federal agencies. Its active technology transfer program with the industrial community dates back to the early days of the missile program.

JPL conducts technology development projects both for NASA and non-NASA sponsors. Non-NASA projects have included Firefly, an aircraft-borne infrared fire-mapping system for the U.S. Forest Service; a document-monitoring system to help the National Archives safeguard the U.S. Constitution, Declaration of Independence and Bill of Rights; medical projects such as robot-assisted microsurgery and medical imaging systems, and Internet-based telemedical systems; and varied projects in such fields as advanced spacecraft and sensor technology, microelectronics, supercomputing and environmental protection.

Research and development activities at JPL include an active program of automation and robotics supporting planetary rover missions and NASA's Space Station program. In supercomputing, JPL has pioneered work with new types of computers to support processing of enormous quantities of data to be returned by space missions in years to come.

In addition to JPL's main Pasadena site and the three Deep Space Network complexes, JPL also supports an astronomical observatory at Table Mountain, Calif., and a launch operations site at Cape Canaveral, Fla. As of 2003, JPL has a workforce of about 5,500 employees and onsite contractors.

Charles Elachi, a scientist with a background in imaging radar and other remote-sensing technologies, became Director of JPL in May 2001. In addition to his JPL post, he serves as a Vice President of Caltech.

White Sands Test Facility honored for

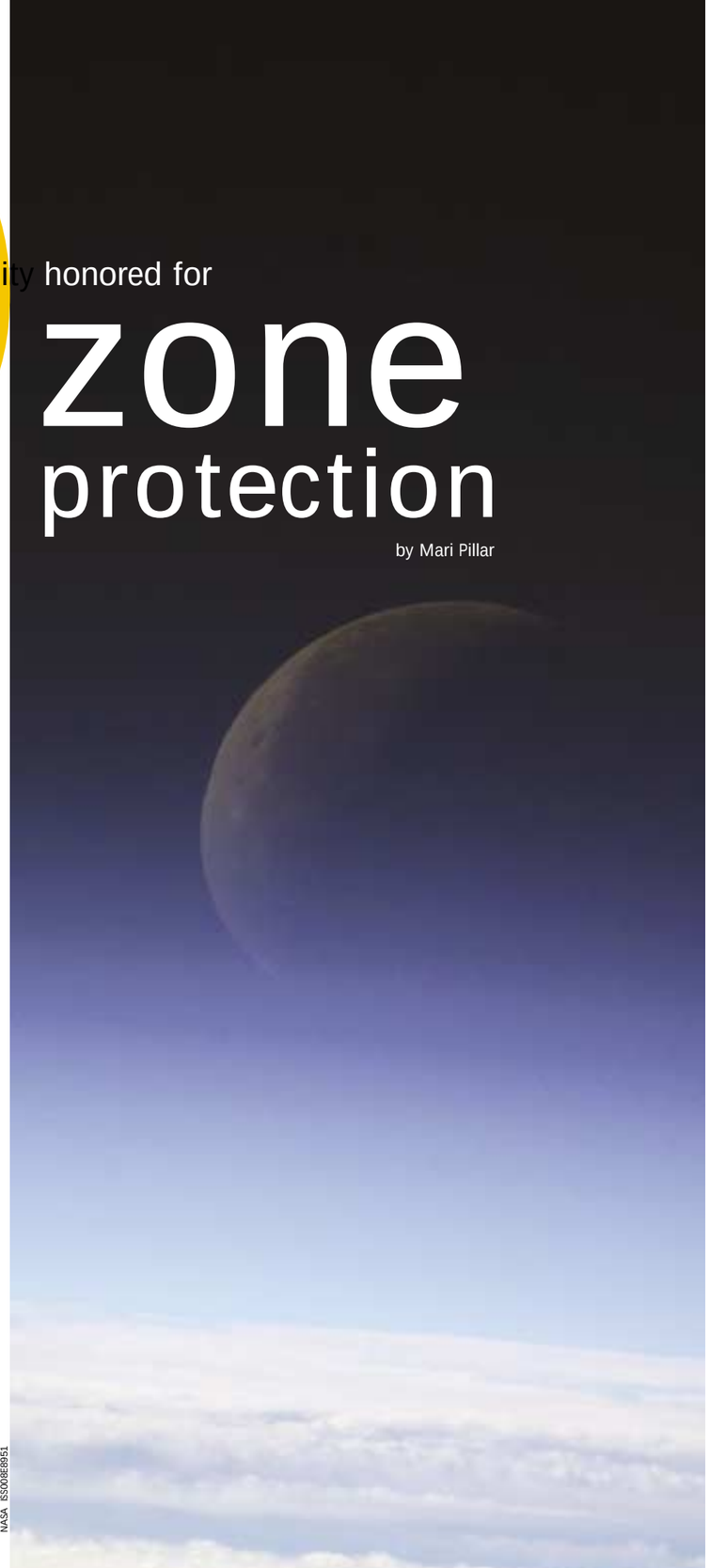
Ozone protection

by Mari Pillar

Thinning Upper Atmosphere

From a vantage point about 225 miles over the Earth, International Space Station crewmembers photographed the crescent Moon through the upper layers of Earth's atmosphere. At the bottom of the image, a closed deck of clouds is probably at about 3 miles. The shades of blue grading to black are caused by the scatter of light as it strikes gas molecules of the very low density upper atmosphere.

Models predict that emissions of carbon dioxide are causing the upper atmosphere to cool and contract, and therefore reduce the density of gases in the layer spanning from 60 to 400 miles above the surface – known as the thermosphere. According to a study by the Navel Research Lab, the density of the thermosphere has decreased about 10 percent over the last 35 years. These findings are important both for space science and for Earth science. Spacecraft in orbit, such as the International Space Station, experience less drag and need fewer boosts to maintain their orbit. At the same time, space debris also remains in orbit longer, which increases hazards to spacecraft. Most importantly, the study validates models of the "greenhouse effect" of increased carbon dioxide release on the dynamics of the atmosphere.



NASA ISS00E8951

The Environmental Protection Agency (EPA) recently announced NASA's White Sands Test Facility (WSTF) as a winner of the 2004 Stratospheric Ozone Protection Award. These awards honor individuals and organizations that have made significant contributions to protecting the environment.

"This award is considered the highest given in the area of global environmental protection," WSTF Special Projects Manager Harold Beeson said. "The fact that you are judged by your peers for this award makes it especially satisfying."

The winners must demonstrate commitment to the environment, actual elimination of ozone-depleting substance emissions, and contributions that help reduce the health and environmental risks of ozone depletion.

NASA Headquarters has also taken notice of this achievement. In a congratulatory memo from William Readdy, the Associate Administrator for Space Flight, he wrote: "The exceptional leadership, personal dedication and technical excellence demonstrated by the White Sands team is remarkable and represents a significant contribution to protecting the environment. The positive effects of these process improvements will be felt across NASA, other government agencies and industry in general."

For years, NASA has been promoting environmentally friendly processes to improve their efficiency and effectiveness. By eliminating the use of CFC-113 (or Freon-113) in all spacecraft parts and components cleaning, WSTF has drastically reduced the amount of ozone-depleting substances used to prepare the Space Shuttle for flight.

"WSTF has been proactive in the replacement of CFC-113 since 1988," Beeson said. "With the ban on production of CFC-113, the ability to clean our hardware was in jeopardy. A small amount of oil in a high-pressure oxygen system can cause that system to ignite and burn, resulting in a catastrophic system failure. The proactive development of alternatives by the WSTF team was essential for our business survival."

WSTF has taken a three-fold approach to eliminating CFC-113 – development of alternative water-based processes, development of ozone-friendly solvent alternatives, and investigation of advanced processes to reduce solvent usage and conserve supplies. WSTF has also taken an industry lead in development of alternatives for oxygen, where organic contaminants and particulates can pose an ignition hazard.

The successful development of new processes and solvent alternatives has virtually eliminated the use of CFC-113 at the facility. Only one gallon was used in 2002, compared to 3,870 gallons in 1990.

WSTF furnishes the technology and expertise gained from its research and development to other NASA centers, industry and governmental agencies to assist in the elimination of CFC-113 in cleaning and cleanliness verification processes industry wide.

The award was presented April 13 at the 2004 Earth Technologies Forum in Washington, D.C., which hosted individuals from 50 countries.

"This was a team effort," Beeson said. "Combining the expertise of the WSTF chemistry lab with that of our clean room and valve shop, the Materials and Processes Branch of the Structural Engineering Division, Naval Sea Systems Command, Kennedy Space Center, U.S. Air Force, and Orbiter Engineering."

Other pollution prevention activities now under way at WSTF include:

- Revegetating 6.5 acres of disturbed land to reduce air pollution caused by wind erosion.
- Using new sand-blasting equipment to separate and reuse sand, which resulted in an 80-percent reduction in waste.
- Modifying test profiles for Space Shuttle thrusters to reduce nitrogen tetroxide and methyl hydrazine use by 36 percent.
- Reclaiming onsite isopropyl alcohol, which saved WSTF $11,750 in FY 2002.

For additional information about NASA's White Sands Test Facility, visit: **http://www.wstf.nasa.gov/**.

NASA WSTF0504E2938

BACK, left to right: Mark Leifeste, HTSI Program Manager; Stephen C. Nunez, Manager of the White Sands Test Facility; Richard McCarson, and Mike Padilla. FRONT, left to right: Harold Beeson, Steve Hornung, Jose Lopez, and Mike Kirsch, Deputy Manager of the White Sands Test Facility.